WHAT IS CLAIMED IS:

1. A method for processing end portion of an optical fiber element having a center core and an outer clad surrounding said core, comprising the steps of:

dipping one end portion of said optical fiber element into an etchant capable of etching the fiber element perpendicularly to level surface of said etchant;

causing the outer clad of said one end portion of said fiber element immersed in said etchant to be etched into a substantially coaxial reduced-diameter portion while causing the outer clad of such a portion of said fiber element that is extended upwardly to a certain height from the level surface of the etchant and that is attached with the etchant which rises upwardly from the level surface due to surface tension of the etchant to be etched into a conical tapered surface portion which is formed between the reduced-diameter portion and un-etched portion of said fiber element;

terminating the etching once said reduced-diameter portion reaches a certain diameter; and

cutting said reduced-diameter portion at a point spaced by a very short distance from the connecting boundary between said tapered surface portion and said reduced-diameter portion toward the reduced-diameter portion so as to leave a reduced-diameter end portion continuously joining to said tapered surface portion.

2. A method for processing end portion of an optical fiber element having a center core in the axial center thereof, a cylindrical clad surrounding said core and an outer cover coating film surrounding said clad, comprising the steps of:

removing said coating film in a partial cylindrical portion thereof having a specified length so as to form a coating film-removed section and a residual coating film section at one end portion of said optical fiber element;

dipping a first part of said coating film-removed section and whole part of said residual coating film section disposed at said one end portion of said optical

fiber element into an etchant capable of etching materials of said core and clad of said fiber element perpendicularly to level surface of said etchant in such a manner that a remaining second part of said coating film-removed section is extending upwardly from the level surface of said etchant to thereby initiate etching process;

causing such a portion of the clad as exposed at the first part of the coating film-removed section of said fiber element and immersed in said etchant to be etched into a coaxial reduced-diameter portion while causing such a portion of the clad as exposed at the second part of the coating film-removed section and attached thereto with said etchant which rises to a certain height above said level surface due to surface tension of the etchant to be etched into a conical tapered surface portion which is formed between the reduced-diameter portion and un-etched portion of said fiber element;

terminating the etching once said reduced-diameter portion reaches a certain diameter;

tapered surface portion has been formed; and

cutting said reduced-diameter portion at a point spaced by a very short distance from the boundary between said tapered surface portion and said reduced-diameter portion toward the reduced-diameter portion so as to leave a reduced-diameter end portion continuously joining said tapered surface portion.

3. The method according to claim 2, which further comprises a step of providing, before the dipping step, a level controlling means for restraining the level surface of said etchant to said optical fiber element at a position where said optical fiber element contacts the level surface of said etchant whereby the axial dimension of said tapered surface portion to be formed on said optical fiber element is set at a predetermined value.

4. The method according to claim 3 wherein, said level controlling means is constituted by an etching-resistant film formed around the peripheral surface of said optical fiber element.

5. The method according to claim 3 wherein, said level controlling means is constituted by a coating film applied to said optical fiber element.

6. The method according to claim 3 wherein, said level controlling means comprises a flat plate made of etching-resistant material and through-apertures formed through said flat plate perpendicularly to the plane of the flat plate, each of said through-apertures having a diameter slightly larger than the outer diameter of the corresponding optical fiber element.

7. The method according to claim 1, which further comprises a step of providing, before the dipping step, a level controlling means for restraining the level surface of said etchant to said optical fiber element at a position where said optical fiber element contacts the level surface of said etchant whereby the axial dimension of said tapered surface portion to be formed on said optical fiber element is set at a predetermined value.

8. The method according to claim 7 wherein, said level controlling means is constituted by an etching-resistant film formed around the peripheral surface of said optical fiber element.

9. The method according to claim 7 wherein, said level controlling means is constituted by a coating film applied to said optical fiber element.

10. The method according to claim 7 wherein, said level controlling means comprises a flat plate made of etching-resistant material and through-apertures formed through said flat plate perpendicularly to the plane of the flat plate, each of said through-apertures having a diameter slightly larger than the outer diameter of the corresponding optical fiber element.

11. The method according to any one of preceding claims 1 through 10 wherein, a liquid having a specific gravity lower than that of said etchant is mixed into said etchant.

12. The method according to claim 11, wherein a plurality of said optical fiber elements held in parallel to each other by a single common covering member to thereby form an optical fiber array, are subjected to processing.

13. The method according to any one of claims 1 through 10, wherein a plurality of said optical fiber elements held in parallel to each other by a single common covering member to thereby form an optical fiber array, are subjected to processing.

14. An optical fiber comprising an optical fiber element having a center core and a outer clad surrounding said core, characterized by having at one end thereof a conical tapered surface portion with a reduced-diameter end portion.

15. The optical fiber according to claim 14, wherein said reduced-diameter portion has a diameter larger than that of the core of said optical fiber element.

16. The optical fiber according to any one of claims 14 or 15, wherein said reduced-diameter end portion has a length no more than its diameter.

17. A method for processing end portion of optical fiber element having a center core and an outer clad surrounding said core, comprising the steps of:

dipping one end portion by a certain length of said optical fiber element into an etchant capable of etching core and clad materials perpendicularly to level surface of said etchant in such a manner that outer periphery of said clad is exposed to the etchant;

time controlling so as to cause such a portion of the clad located at said one end portion as immersed in said etchant to be etched into a reduced-diameter portion of a substantially coaxial shape while to cause such a portion

of the clad as extended upwardly to a certain height from a level surface of the etchant where said etchant is attached and rises upwardly from the level surface due to surface tension of the etchant to be etched into a conical tapered surface portion wherein lower and upper ends of the tapered surface portion are continuously connected to the reduced-diameter portion and outer periphery of the un-etched clad, respectively;

terminating the time controlling once said reduced-diameter portion reaches a certain diameter; and

cutting said reduced-diameter portion so that a reduced-diameter end portion is obtained which is continuously joining to said tapered surface portion.